

CHAPTER 1

INTRODUCTION

1.1 Introduction

Economics changes have brought competitiveness in Electronics Manufacturing Services (EMS) to maintain position in the market. A manufacturer has to search the solutions to streamline the production process. Therefore, the application of suitable management concepts which are aiming on eliminating waste and improving production processes are needed. Manufacturing companies worldwide are now focusing on Lean manufacturing or can be known as Toyota Production System (TPS) since the system can reduce waste and improve quality.

Manufacturing nowadays relies more on the usage of machines due to the complex design of the product and tight competition among manufacturers. Machines need to be set-up and maintained. Setup time for a machine will affect actual future production. Long setup time is an obstacle to the machine productivity and a core production organization issue. Thus, reducing set-up times is a major challenge for optimization leading to Lean production system, especially when it comes to realizing the ability to serve high-mix and low-volume markets. Changeover is often combined with long waiting time and a tiresome production start-up and is counterproductive to efficiency. Long machine runtimes appear to result in low unit costs and large production batches mean efficient use of the system (Herr, 2014).

One of the most popular approaches that been widely applied is Single Minute Exchange of Die (SMED). SMED was initiated in early 1950's by Shigeo Shingo, a Japanese Industry Engineer in order to reduce setup time and provide quick equipment

changeover and rapid die exchange (M.S.Desai & R.M.Warkhedkar, 2011). The phrase “single minute” does not mean that the changeover process should take *one* minute, but the process should take less than 10 minutes or in other words, it meant by “single-digit minute”. Single Minute Exchange of Die (SMED) is often referred as “Quick Changeover”. Both SMED and quick changeover are the methods of reducing the duration of time to change a line or machine from running one product to the next product (Vorne Industries, 2005).

Quick changeover (QCO) is a structured approach on analysing the activities which take place during a changeover and which later sequencing, eliminating or reducing the activities required to complete the process. While changeover time is the duration of time that is measured from the completion of the last piece on the current batch to the completion of first good piece of the next batch. The aim of reducing changeover time is to allow more frequent changeovers which can increase the production flexibility (McMahon, 2010). Quick changeovers allow for smaller lot sizes rather than big lot size which can cause waste in inventory. The introduction of quick changeover concepts allows operations to work with a more real-time production plan which, if used correctly, leads to smaller production batches, lower inventory levels, shorter time on cycle times, shorter capital circulation times and finally, more satisfied customers and an achiever competitive edge (Herr, 2014).

1.2 Problem Statement

Long setup time is an obstacle to the machine productivity. Thus, reducing set-up times is a major challenge for optimizing leading to Lean production system, especially when it comes to realizing the ability to serve high-mix and low-volume markets (Herr, 2014). Quick changeover approach is one of the lean tools that can be applied in order to reduce setup times. Computer Numerical Control (CNC) machine contributes to the highest machine downtime issue at the company. Setup or changeover is where the productivity slows down or stop. The downtime of CNC machine will cause a loss in the production. Therefore, it is essential to apply quick changeover to reduce the setup time of the changeover.

One of the issue in this project is lack of documentation on the steps or procedures done throughout the changeover process. The changeover process was done by the

technical support without any guidance or documentation. Most of the time, the steps throughout the changeover process was done based on their own experience. The changeover process was done with trial and error method since there is no documentation involved. Furthermore, the changeover process for the CNC machine was done by one person only. This will be a huge problem to the production since the changeover will rely on one person. If the person is absent, this will cause a great loss on the production.

When the changeover time is reduced, the organization's manufacturing costs are reduced as well as increasing flexibility to meet customer demands. It is very important to reduce machine setup time during the implementation of lean manufacturing because the time has a significant impact on manufacturing costs due to decreasing sizes of series orders (Goubergen & Landeghem, 2002).

1.3 Background of Company

This project is a collaboration with TT Electronics Sdn. Bhd. which is located in the centre city of Kuantan, Pahang. TT Electronics is one of the global providers of engineered electronics industries which contributes to high complexity electronic and electromechanical for global manufacturing companies. TT Electronics Integrated Manufacturing Services is one of world's largest business-to-business contract manufacturing companies with manufacturing centre which located in China, Malaysia, the United Kingdom and the United States. TT Electronics has partnerships with manufacturers across aerospace and defences, industrial and rail markets and medical. Logo of TT Electronics is shown in the Figure 1.1.



Figure 1.1 Logo of TT Electronics Sdn. Bhd.